

# PATENT SPECIFICATION

(11) 1 244 370

DRAWINGS ATTACHED

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- (21) Application No. 59864/68 (22) Filed 17 Dec. 1968  
(31) Convention Application No. 17794 (32) Filed 27 Dec. 1967 in  
(33) Sweden (SW)  
(45) Complete Specification published 2 Sept. 1971  
(51) International Classification B 25 d 17/08 //9/04  
(52) Index at acceptance  
B4C IB1A 6B1 6C



## (54) IMPROVEMENTS IN IMPLEMENT RETAINERS FOR PERCUSSION TOOLS

(71) We, ATLAS COPCO AKTIEBOLAG, a Swedish company, of Nacka, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an implement retainer for percussion tools.

One object of the invention is to provide an implement retainer which is cheap in manufacture and has high resistance to damage and which permits the insertion and removal of an implement having a shank with a collar and a shank end adapted to be inserted in the tool in a simple manner. A further object of the invention is to provide an implement retainer which may be used in connection with working implements having a shank portion with a collar and a portion carrying a spade-shaped blade, a broad-bladed chisel or another device which has substantially larger cross sectional dimensions than on opening in the implement retainer. The implement retainer according to the invention furthermore eliminates the use of separate percussion damping elements. The retainer according to the invention does not cause wear of the tool. The above and other objects are achieved by the invention.

In accordance with the present invention there is provided in combination with a percussion tool, an implement retainer for a working implement having a shank with a collar, and a shank end adapted to be inserted in said tool, said retainer comprising: a sleeve of resilient material, such as rubber, fixation means on said sleeve engageable with fixation means on the tool for holding the sleeve on to the tool against axial displacement, an end portion on the sleeve capable of flexing resiliently radially outwards, an inwardly directed retaining

[Price 25p]

flange on said end portion, the minimum diameter of the opening defined by said flange being less than the external diameter of said collar, and a radially substantially non-yielding locking ring having a minimum internal diameter greater than the external diameter of said collar and adapted to be secured to the end portion of the sleeve to prevent radial flexing therein.

The present invention further provides an implement retainer for retaining in a percussion tool a working implement having a shank with a collar, said retainer comprising: a sleeve of resilient material provided with fixation means thereon for securing said retainer to said tool; an end portion on the sleeve capable of flexing resiliently radially outwards; an inwardly directed retaining flange on said end portion, the minimum diameter of the opening defined by said flange being less than the external diameter of said collar; and a radially substantially non-yielding locking ring having a minimum internal diameter greater than the external diameter of said collar and adapted to be secured to the end portion of the sleeve to prevent radial flexing therein.

In the accompanying drawings some embodiments of implement retainers according to the invention are illustrated by way of example. Fig. 1 is a side view and partial section of a percussion tool such as a concrete breaker, a spade machine or a powered chisel provided with an implement retainer according to the invention. Fig. 2 is a side view of the retainer according to Fig. 1. Fig. 3 is a fragmentary side view and section of a modification of the tool in Fig. 1, and Fig. 4 is a fragmentary side view and section of a further modification of an implement retainer according to the invention. Fig. 5 is a detail of Fig. 3 in side view.

The percussion tool illustrated in Fig. 1 is a compressed air driven chisel or a com-

pressed air driven concrete breaker or the like which has a cylinder casing designated 1. A hammer piston 2 is movable back and forth in the cylinder casing under the action of a pressure fluid such as compressed air. The cylinder casing has a lower end portion 10 provided with a chuck bushing 3 for a working implement which is inserted in the percussion tool. The working implement has a shank 4 with an annular collar 5 and a shank end 6 which in the illustrated embodiment has a circular cross section along a portion 7 adjacent the collar 5 and hexagon cross section along a portion 8. The portions 7, 8 fit in corresponding parts of the chuck bushing 3. The shank 4 of the working implement may carry a spade-shaped blade, a broad-bladed chisel or another not illustrated device such as a straight chisel, for instance a pike. The working implement 4, 5, 6 is held in the tool by an implement retainer 9 which comprises a slightly conical sleeve of rubber fitted on the lower end portion 10 of the cylinder casing 1. The implement retainer has annular cross section and is slightly conical and is provided at the upper end with a fixation means in the form of an internal annular flange 11 which fits into and engages an annular groove 12 in the outer wall of the cylinder casing 1. In certain cases the resiliency of the annular flange 11 may be sufficient for holding the retainer onto the tool but in order to increase the grip it may sometimes be suitable to provide a preferably split spring steel ring 13 which surrounds the retainer and is positioned in an external annular groove 14 in the retainer. If the ring 13 is a continuous ring the elasticity of the rubber of the retainer and the inner diameter of the ring have to be selected so that the ring may be forced into position on the sleeve. At a lower narrow end portion 23 of the implement retainer an axial slit 15 is provided which ends in an opening 16. The end portion 23 of the retainer forms an internal annular flange 17 the diameter of the smallest opening 18 of which is less than the external diameter of the collar 5 so that when the collar is in the retainer the collar is prevented from passing out through the opening 18. In certain cases the radially resilient portion 23 of the implement retainer may be made without a slit and instead may be made with such elasticity that the collar 5 may be pressed through the opening 18. A continuous substantially non-yielding annular steel ring 19 encloses the narrow end portion 23 of the retainer 9 and is provided with an internal annular flange 20 which when the ring 19 is in position engages an external annular groove 21 of the retainer.

When it is desired to remove the working

implement 4, 5, 6 from the implement retainer 9 the steel ring 19 is first loosened from the retainer whereupon the shank of the working implement with the collar 5 may be pulled out of the retainer and the implement may be removed. The internal diameter of the opening 22 of the ring 19 is larger than the outer contour of the collar 5 so that the ring 19 without difficulty may be passed over the collar. When it is desired to insert a working implement in the retainer according to the invention a ring 19 is first placed around the shank of the implement and moved on past the collar 5 whereafter the implement is inserted with the shank end 6 and the collar 5 through the implement retainer which then yields resiliently and permits the insertion so that the shank end 6 can be inserted in the chuck bushing 3. The locking ring 19 is then pushed over the narrow end portion 23 of the retainer into position as illustrated in Fig. 1. The implement is then locked in the implement retainer so that it can not fall out. The annular flange 17 and the material of the implement retainer form a resilient abutment or shoulder for the collar 5 so that no separate percussion dampening device is necessary. The implement retainer according to the invention may naturally be used in connection with any working implement which has a shank 4 with a collar 5 or a similar projection thereon and a shank end adapted for insertion in a chuck bushing or the like in a tool. Such working implements may for instance be spades, chisels, pikes and the like.

The embodiment of the invention illustrated in Figs. 1 and 2 should only be considered as an example and may be modified in several different ways within the scope of the claims. In the modification according to Figs. 3-5 the same reference numerals as in Figs. 1 and 2 have been used to indicate equivalent parts. Fig. 3 illustrates in section only the right lower portion of a percussion hammer 1 or the like. In order to retain an implement retainer 39 onto the casing 1 said casing is here provided with a number of projecting lugs 33 and the retainer 39 has corresponding recesses 34. The retainer sleeve 39 is fitted on the casing 1 by pressing the sleeve over the projecting lugs 33 which in order to facilitate assembly and fixation of the sleeve have surfaces 35, 36 inclined slightly upwards. In the modification according to Fig. 4 the locking ring 29 is provided with a sleeve-like member 30 which extends upwards along the outside of the end portion 23 and stiffens and protects said end portion. The sleeve-like member 30 may be a part separate from the ring 29.

#### WHAT WE CLAIM IS:—

1. In combination with a percussion

- tool, an implement retainer for a working implement having a shank with a collar, and a shank end adapted to be inserted in said tool, said retainer comprising: a sleeve of resilient material, such as rubber, fixation means on said sleeve engageable with fixation means on the tool for holding the sleeve on to the tool against axial displacement, an end portion on the sleeve capable of flexing resiliently radially outwards, an inwardly directed retaining flange on said end portion, the minimum diameter of the opening defined by said flange being less than the external diameter of said collar, and a radially substantially non-yielding locking ring having a minimum internal diameter greater than the external diameter of said collar and adapted to be secured to the end portion of the sleeve to prevent radial flexing therein.
2. The combination according to claim 1, in which the fixation means on said sleeve comprises an inwardly directed flange at the fixation end of the sleeve, and the fixation means on the tool comprises an annular groove therein which is resiliently engaged by said flange for holding the sleeve against axial displacement.
3. The combination according to claim 2 in which a spring ring is provided at the outside of the sleeve in the area only of said last-mentioned inwardly directed flange.
4. The combination according to claim 1 in which the fixation means on the sleeve comprises recesses in the sleeve and the fixation means on the tool comprises corresponding lugs projecting therefrom.
5. The combination according to any preceding claim in which the resilient end portion of the sleeve has an external annular groove and said locking ring has a radially inwardly directed annular flange which engages said groove and is held therein by the resilience of the end portion and which prevents the end portion from flexing outwards and the collar from moving out from the sleeve.
6. The combination according to any preceding claim in which the resiliently flexing end portion is axially split.
7. The combination according to any preceding claim in which the radially outwardly resiliently flexing end portion is supported by a sleeve-like member.
8. The combination according to claim 7 in which said member is made integral with said locking ring.
9. An implement retainer for retaining in a percussion tool a working implement having a shank with a collar, said retainer comprising: a sleeve of resilient material provided with fixation means thereon for securing said retainer to said tool; an end portion on the sleeve capable of flexing resiliently radially outwards; an inwardly directed retaining flange on said end portion, the minimum diameter of the opening defined by said flange being less than the external diameter of said collar; and a radially substantially non-yielding locking ring having a minimum internal diameter greater than the external diameter of said collar and adapted to be secured to the end portion of the sleeve to prevent radial flexing therein.
10. An implement retainer according to claim 9 in which said fixation means comprises an inwardly directed flange.
11. An implement retainer according to claim 10 in which a spring ring is provided at the outside of the sleeve in the area only of said last-mentioned inwardly directed flange.
12. An implement retainer according to claim 9, in which said fixation means comprise recesses in the sleeve.
13. An implement retainer according to any of claims 9 to 12 in which the resilient end portion of the sleeve has an external annular groove and said locking ring has a radially inwardly directed annular flange which engages said groove and is held therein by the resilience of the end portion and which prevents the end portion from flexing outwards and the collar from moving out from the sleeve.
14. An implement retainer according to any of claims 9 to 13 in which the resiliently flexing end portion is axially split.
15. An implement retainer according to any of claims 9 to 14 in which the radially outwardly resiliently flexing end portion is supported by a sleeve-like member.
16. An implement retainer according to claim 15 in which said sleeve-like member is made integral with said locking ring.
17. The combination of a percussion tool and an implement retainer for a working implement substantially as hereinbefore described with reference to and as shown in Figs. 1 and 2 of the accompanying drawings.
18. The combination of a percussion tool and an implement retainer for a working implement substantially as hereinbefore described with reference to and as shown in Figs. 3 and 5 of the accompanying drawings.
19. The combination of a percussion tool and an implement retainer for a working implement substantially as hereinbefore described with reference to and as shown in Fig. 4 of the accompanying drawings.
20. An implement retainer for a working implement substantially as hereinbefore described with reference to and as shown in Figs. 1 and 2 of the accompanying drawings.
21. An implement retainer for a working

implement substantially as hereinbefore described with reference to and as shown in Figs. 3 and 5 of the accompanying drawings.

- 5 22. An implement retainer for a working implement substantially as hereinbefore described with reference to and as shown in

Fig. 4 of the accompanying drawings.

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Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1971.  
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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3 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of  
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SHEET 1

Fig. 1

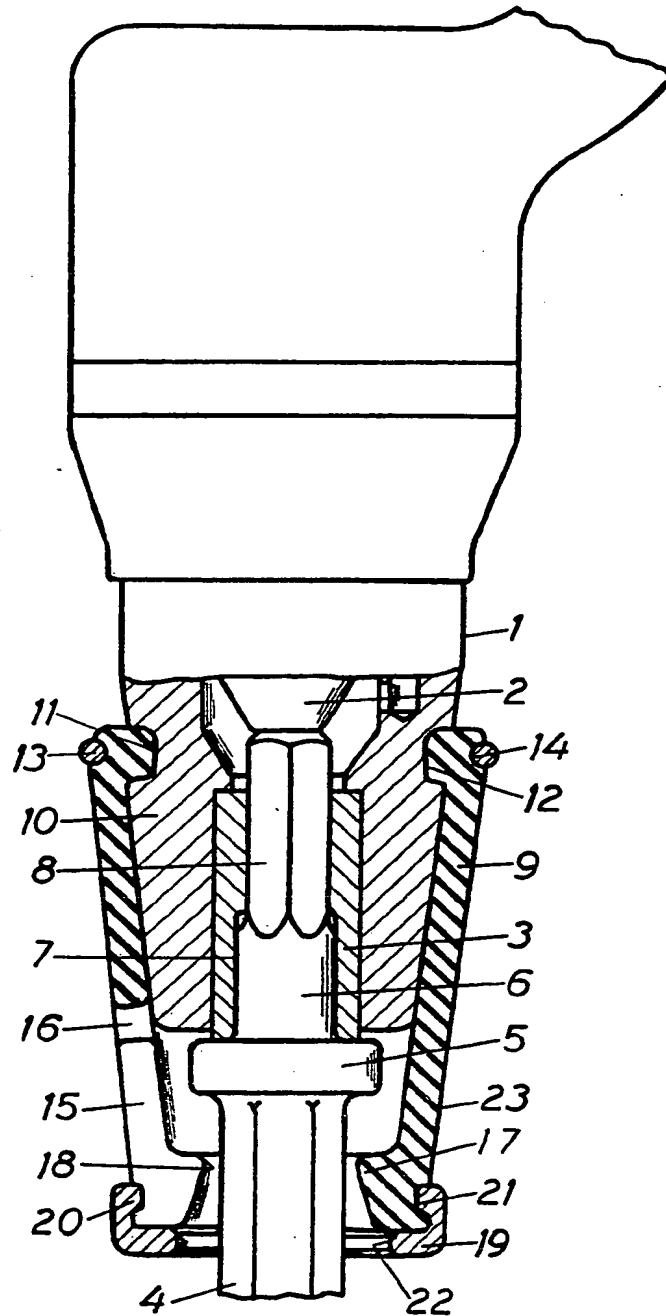


Fig. 2

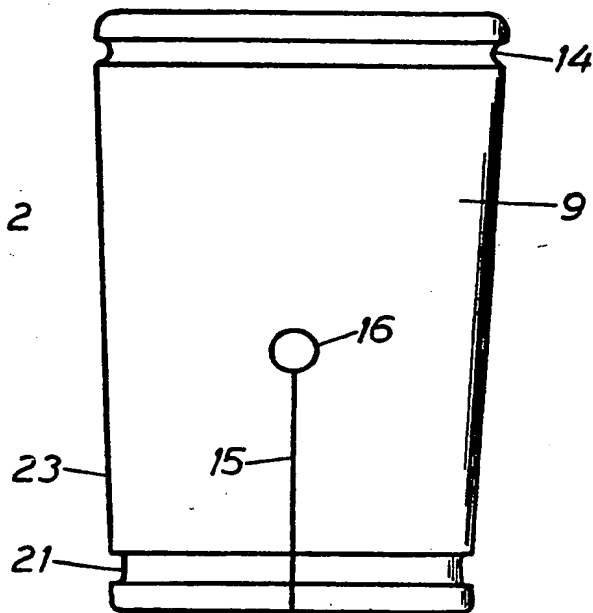


Fig. 4

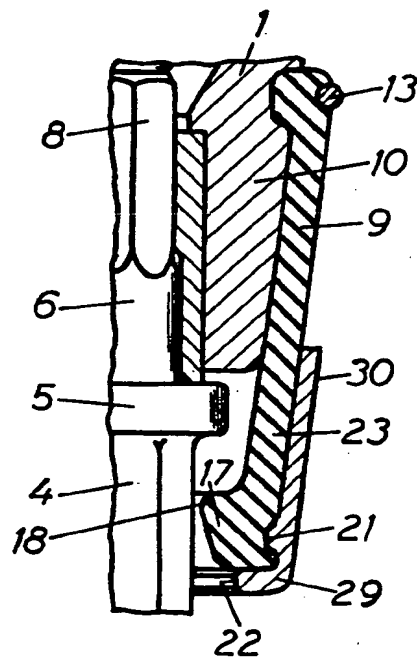


Fig. 3

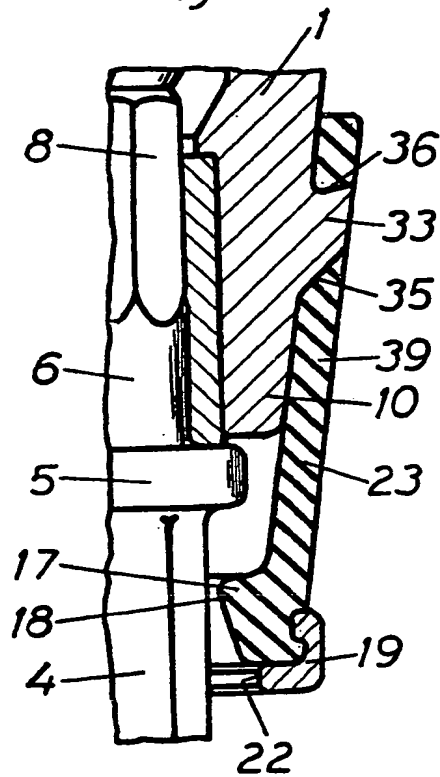


Fig. 5

